

**MEETING THE  
MILWAUKEE FIRE DEPARTMENT  
DEMAND FOR PERSONAL COMPUTERS**

FIRE SERVICE FINANCIAL MANAGEMENT

BY: Donald G. Doro  
Milwaukee Fire Department  
Milwaukee, Wisconsin

An applied research project submitted to the National Fire Academy  
as part of the Executive Officer Program

August 2000

## ABSTRACT

Since the day the first personal computer was purchased by the Milwaukee Fire Department, there has been an ever-expanding need for these types of business tools. Starting with the first personal computer, replacement and upgrade was done in a haphazard manner, with little consideration for age of the machine, compatibility with software applications and the specific needs of the user. Further complicating matters was a lack of a complete and comprehensive inventory system.

The purpose of this research was to examine the variables that affect the decisions to replace a Milwaukee Fire Department personal computer and examine the future growth of demand for computers within the department. Descriptive research was used to answer the following questions:

1. What is the present inventory of personal computers on the Milwaukee Fire Department?
2. What are the future projected needs for personal computers for the Milwaukee Fire Department?
3. What is the most cost-effective manner of acquisition of personal computers for the Milwaukee Fire Department?

Procedures used to complete this research included a literature review, a review of Milwaukee Fire Department computer inventories, a strategic goal review and a comparison of acquisition options. The results of this research found a lack of inventory control within the Milwaukee Fire Department, a projected growth in the need for additional personal computers, and outright purchase being the most cost effective manner of computer acquisition.

The recommendations of this research project included expansion of the inventory system for all personal computers and peripherals, periodic replacement of all personal computers in attempt to stay ahead of the technology curve, and the continuation of cash purchase of all personal computers.

## TABLE OF CONTENTS

	<b>PAGE</b>
Abstract .....	2
Table of Contents .....	3
Introduction .....	5
Background and Significance .....	6
Literature Review .....	10
Procedures .....	15
Results .....	18
Discussion .....	20
Recommendations .....	22
References .....	24
Appendix .....	26

## INTRODUCTION

There is one truth about acquiring a computer. Your personal computer (PC) is obsolete the instant you open the box (Miller, 2000). Keeping an arsenal of desktop and notebook computers up to date has perplexed businesses large and small for years. Due to various market forces, such as an ever-increasing need for processing speed and power required by today's applications and operating systems, computers are facing obsolescence at an annoyingly frequent rate (O'Donnell, 1998).

This is not unique only among private businesses. The Milwaukee Fire Department (MFD) faces the need to timely replace computers in the most economical and cost effective manner. Once the first personal computer was purchased by the department in 1986, the demand for access to these types of tools has been ever increasing. This demand was first witnessed at the administrative level of the department, but in recent years the demand from field personnel has increased dramatically (D. Michalowski, personal communication, May 18, 2000).

What was once only a problem of acquisition now has been complicated by a need for timely replacement of the personal computer inventory (Milwaukee Fire Department, 1999). Even when equipment acquisition appears to be straightforward, a business must compare the cost of the item with the needs of the organization (Held, 1991). The problem that prompted this research was the replacement of personal computers was based primarily on the failure of the machines to perform operations required by the operator. This practice failed to take into account other variables such as periodic, systematic replacement schedules and the comparison of purchase options. The purpose of this research was to examine the variables that affect the decisions to replace a

Milwaukee Fire Department personal computer and examine the future growth of demand for PCs within the department. In addition, leasing versus purchasing of personal computers will be examined. This research project employed a descriptive research methodology to answer the following questions:

1. What is the present inventory of personal computers on the Milwaukee Fire Department?
4. What are the future projected needs for personal computers for the Milwaukee Fire Department?
5. What is the most cost-effective manner of acquisition of personal computers for the Milwaukee Fire Department?

The procedures used to complete this research project included a literature review, a review of Milwaukee Fire Department personal computer inventory, a projection of future personal computer requirements for the department, and a comparison of acquisition procedures for personal computers.

## **BACKGROUND AND SIGNIFICANCE**

The Milwaukee Fire Department (MFD) is typical for a United States fire service organization. It is considered a quasi-military organization, with a well-defined rank structure ranging from the entry-level position of firefighter to the highest rank of Chief Engineer. The City of Milwaukee, Wisconsin is located in the Midwest area of the United States, approximately 90 miles north of Chicago. The 1,062 members of the fire department, serving a population of over 600,000 inhabitants, offer a full range of protective services to the community, including fire protection and prevention, emergency medical services, and a full complement of specialized services including hazardous material mitigation, dive rescue and all forms of technical rescue (Milwaukee Fire and Police Commission, 1997).

Emergency services are provided by the fire fighting division, which is comprised of 6 battalions, 36 firehouses, 37 engine companies, 16 ladder companies, 8 paramedic units, and 4 fire squad companies. The other bureaus of the department are Administration, Construction and Maintenance, Emergency Medical Services, Instruction and Training, Special Teams, and Technical Services. The annual budget for the department exceeds \$72 million (Milwaukee Fire Department, 1999).

In 1986, the Bureau of Technical Services was organized within the command structure of the Milwaukee Fire Department. Prior to that time, there was not a need for this separate bureau due to the very limited scope of computerization in both City of Milwaukee government and the Milwaukee Fire Department. Sensing a future need, the Chief of the department ordered a study to create a bureau that would be in charge of

researching and implementing the computer strategy for the MFD (Milwaukee Fire Department, 1998). Starting with a single computer that same year, the department took its first small steps toward modernizing the way it did business (D. Michalowski, personal communication, May 18, 2000).

Since that time, the Milwaukee Fire Department has added a mainframe computer system as a platform for its computer aided dispatch (CAD) system, along with 6 dispatch consoles and over 50 dedicated CAD computer terminals in all fire houses and other fire department locations. Starting with that single computer assigned to administration in 1986, there are now 68 personal computer workstations in use by administrative and field personnel (Milwaukee Fire Department, 1999). This has lead to an increase in departmental productivity and a streamlining of many record keeping, budgetary and data analysis functions (Milwaukee Fire and Police Commission, 1998).

The expansion of the personal computer has been lacking in direction since the first computer purchase. According to Captain Jeffery Zinuticz of the Bureau of Technical Services, purchases of PCs were often in response of an immediate need or desire by a particular employee, rather than in the context of an overall strategic plan encompassing all of the department's needs. Although all personal computer purchases were IBM based machines, there was little thought to buying from the same manufacturer or purchasing in large enough quantities to receive discounted pricing. This had lead to higher than required costs and difficulty in determining the maintenance expense and longevity of a particular computer. The need for an accurate inventory is long overdue. First, to have a clear view of equipment already in place, secondly, to have a better understanding of future equipment needs.



The Milwaukee Fire Department personal computer needs will expand in future years. Lawrence Gardner, Chief of the Milwaukee Fire Department, has committed to being an integral part of the National Fire Incident Reporting System (NFIRS). NFIRS will allow the MFD to be part of a national database of fire incidents. To be part of this undertaking and achieve a high level of efficiencies, every company officer will require a personal computer on his or her desktop in the firehouse. This will allow all company officers to enter fire and medical reports directly into the database of the department, rather than handwriting the reports to be later entered electronically by the administrative staff. In addition to NFIRS requirements, personal computers will be needed to enter electronically data that is now entered manually on paper timecards, as well as field reporting of other personal matters relating to staff requirements (J. Zinuticz, personal communication, May 16, 1999).

Since the first computer purchase made by the Milwaukee Fire Department, the transaction was always a direct payment at the time of billing. Other options, primarily leasing of computers, have been used by both public and private agencies. The cost effectiveness of leasing when compared to outright ownership should be compared. Business managers must search for ways to reduce their capital and operating costs (Schallheim, 1994). As budget constraints get tighter, spending alternatives should be examined.

These questions are very important to this author. In my position as Deputy Chief in charge of the Milwaukee Fire Department Bureau of Technical Services, it is my assignment to implement a effective inventory system and use cost saving measures

whenever possible. It is felt that this research will lay the groundwork for the future success of the Milwaukee Fire Department.

This research project was completed in accordance with the applied research requirements of the National Fire Academy's Executive Fire Officer Program. The problem addressed by this research project relates specifically to Unit VI, "Analysis", and Unit VIII, "Budget Management", of the *Fire Service Financial Management* course. In these units of instruction, students were taught the importance of benefit-cost analysis and the ability to assess objective and subjective methods of evaluating alternatives, as well as the importance of projecting the useful life span of assets as part of the purchasing process.

## **LITERATURE REVIEW**

### **The Importance of Inventories**

Inventories can be defined as stocks of goods or assets held for expected future use or for potential future use (Stevenson, 1992). Typically, an organization does not acquire an asset such as a personal computer for a single use, but acquires and holds on to that type equipment for continued use by employees. One of the most important reasons for having an inventory of computers is to respond quickly to anticipated demand. Expansion of the number of computers is in response to normal productivity needs. While one computer can increase productivity, productivity can also suffer if employees are lined up to use the machine.

Another reason for adequate number of computers is to separate the stages of operations. Most businesses find it more economical to maintain a constant work force

and a steady rate of output from employees than to permit output and employment to vary (Stevenson, 1992). Simply stated, it is often better to have a computer for each employee that may require the use of a PC rather than having the output of their required duties to suffer while waiting for the use of a machine.

An inventory can be described as an actual count of a particular type of asset. The act of taking an inventory allows a manager to take an accurate look at the number of computers in relationship to the number of employees that may require the use of a computer. Information Technology (IT) departments trying to manage their technological assets are constantly having to buy machines to replace outdated hardware (O'Donnell, 1998). An inventory is an early important step in the process of forecasting future needs (Held, 1991).

### **The Effects of Advancements in Computer Technology**

A personal computer is obsolete the instant you open the box. At one time, computer technology was changing dramatically every five years. As recently as 1998, these same changes were taking place approximately every eighteen months. Current estimates say major changes are now occurring every six months (Miller, 2000). This makes one of the primary concerns for any type of company that uses computer equipment is staying ahead of the technology curve (P.C. Week, 1997).

When acquiring equipment, it is important to distinguish between system and item life (Held, 1991). Many personal computers are still serviceable and able to perform many of their required functions enough though they may be several years old. This is an example of item life. Yet these same computers may be considered obsolete due to

incompatibility with newer software or a lack of processing power to operate needed software programs. Any purchases should be made with future compatibility with emerging trends (O'Donnell, 1998).

### **Comparison of Information Technology Funding and Equipment**

In a report prepared for the Seattle Fire department, Pacific Technologies, Inc. compared IT budgets of six metropolitan fire departments. This report included the Milwaukee Fire Department, the study found that Milwaukee had an information technology budget that was, on average, comparable to other similar cities. The report stated that the optimal IT spending as a percentage of an overall fire department budget should fall into the 1.5 to 3.0% range. The Milwaukee Fire Department fell slightly below this range, usually correlating to notable degradation in the information technology area of a fire department (Seattle Fire department, 1999).

The report also examined the ratio of personal computers to workstation support staff. Here Milwaukee fared somewhat better, falling into a range that would indicate an optimal balance of labor cost and service quality. The company performing the study felt that a ratio between 100 to 150 personal computers to support personnel was an acceptable working environment (Seattle Fire Department, 1999).

### **Alternatives to Personal Computer Purchase**

Many IT professionals state that a computer's usefulness often reaches zero well before its paper value says so. Because of that reason, many companies are looking toward leasing as a viable alternative to outright purchase. Some advantages are no

longer having to manage the physical assets, dealing with off loading, and storing and caring for old equipment. Companies are now replacing the computer inventory every two to three years, sending the old equipment back and get whatever happens to be the latest, greatest PCs at that time (O'Donnell, 1998).

Leasing has become so popular that over 25% of private companies lease some of their distributed computers (PC Week, 1997). In an industry where a hot, state of the art computer can become a dinosaur in months, leasing allows you to stay on top of the tech curve (Rodgers, 2000). One study suggested that businesses of all sizes would be twice as likely to lease technology in the year 2002 than they are today. Leasing allows businesses acquire technology through predicable monthly payments, rather than paying for everything up front. With the rapid turnover in technology, leasing also provides some protection against technology obsolescence (Mehler, 1998). Many lease contracts for computers actually assume a zero salvage value for the equipment at the end of the lease (Schallheim, 1994).

An obvious advantage to leasing is paying for an asset over its reasonable useful life, which also gives a cash flow improvement that is worth considering (Bohmke, 1991). A lease can be used as a financing tool hat allows governmental entities to acquire essential equipment and to complete necessary projects at low, tax-exempt interest rates. Municipal managers can use leases to efficiently manage cash flows. The leases provide an opportunity to use an asset immediately, while distributing the payment over the asset's useful life (Carter, 1999).

### **The Disadvantages of Leasing**

Leases are more expensive than buying the same item (Sutton, 1991). An analysis shows that finance charges will drive up the cost of a leased computer hundreds of dollars over its cash price. Leasing a computer would even cost more than if you bought it with a credit card (Consumer Reports, 1998). In addition to the monthly payments, many companies add on document processing fees and shipping or restocking fees at both ends of the lease (Spring, 1998). According to the City of Milwaukee budget office, it is more economical to purchase outright an item such as a computer than to lease the same machine (D. Rotar, personal communication, May 21, 2000).

### **Literature Review Summary**

The literature review provided insights into sound business practices that would aid the Milwaukee Fire Department in both the areas of asset control and efficient purchasing procedures.

A review of fire department related textbooks offered very little insight into effective personal computer management in a fire department setting. Other texts that were more business related offered insights into asset control and successful inventory management. The writings of various authors (Held, 1991: O'Donnell, 1998: Stevenson, 1992) stressed the importance of sound inventory practices.

An important consideration with any computer purchase is the pace at which a PC becomes obsolete. Several authors (Held, 1991: Miller, 2000:, O'Donnell, 1998) stressed the fact that personal computers have a very short life span. This then becomes a major consideration when reviewing acquisition policies. Leasing, while practical for many

municipalities, loses many of its advantages when applied toward acquiring a personal computer. The variables of life span and cash flow become prime factors when deciding either to buy or lease.

## **PROCEDURES**

This research project employed a descriptive research methodology to (a) examine Milwaukee Fire Department inventory practices, (b) forecast future personal computer needs of the Milwaukee Fire Department, (c) examine alternative acquisition procedures for Milwaukee Fire Department personal computers, and (d) compare purchase versus lease options of personal computers.

### **Literature Review**

The literature review was first started at the National Fire Academy's Learning Resource Center (LRC) during February 2000. The literature review was continued at the headquarters of the Milwaukee Fire Department in Milwaukee, Wisconsin, the Milwaukee Federated Library System, the resources of the Internet and the author's personal library.

The literature review attempted to uncover fire department related trade journals, magazines and textbooks that contained information on personal computer inventory systems, replacement programs for PCs, and cost comparison of lease vs. purchase of personal computers. A summary of all applicable sources can be found in the Literature Review section of this project.

### **Review of Milwaukee Fire Department Computer Inventories**

A review of the personal computer inventory records was performed during March and April 2000. The review examined age of all personal computers, the primary user, processing speed, hard drive size and the amount of Random Access Memory (RAM). The data was collected and organized using a Microsoft Excel spreadsheet.

### **Strategic Goals of the Milwaukee Fire Department**

A review of the strategic goals of the Milwaukee Fire Department was conducted during April and May 2000. The review process included examination of department documents and discussions with the Chief and Assistant Chief of the MFD. In addition, a review of all future plans relating to computer usage relating to citywide computer applications was also performed.

### **Acquisition Options**

Discussions with the City of Milwaukee Budget Office and Purchasing Department took place during May 2000. Conversations revolved around the legal aspects of leasing, life span of personal computer systems and the economic factors of leasing vs. purchasing,

### **Assumptions**

Certain assumptions were made during this research project. The first assumption is that all of the referenced authors performed objective and unbiased research. The second assumption is that an accurate count of personal computers was performed.



Thirdly, during personal conversations all questions were answered fairly. Finally, there will not be substantial alterations of the City of Milwaukee financial software applications.

### **Limitations**

The primary limitations that affected this research project included very little fire department information pertaining to personal computer inventory systems and time constraints.

Surprisingly, little has been written that directly related to fire department personal computer inventories and acquisition. There exists a much greater body of work pertaining to leasing high value equipment such as apparatus and buildings. While some of this material at first was thought to be useful, upon further examination there was little comparison between high-ticket items such as a fire engine and a relatively inexpensive personal computer. A primary reason for the inability to compare was the much greater expected life span of a vehicle when compared to a PC.

The six-month time limit set by the National fire Academy for the completion of this research project did not allow a more comprehensive study of successful programs that may be in place within the United States fire service.

## **RESULTS**

### **1. What is the present inventory of personal computers on the Milwaukee Fire Department?**

There are really two different groups of personal computers within the Milwaukee Fire Department. The first group is a PC that is dedicated to the Computer Aided Dispatch system. The total number of CAD computers is 52. While by definition these are personal computers, because the nature of their primary duty is dedicated to dispatch functions, these PCs are considered separate from the other department PCs. The inventory of these machines remains constant and having eight additional systems in reserve facilitates replacement of these units. This process will continue until the CAD system is upgraded in fiscal year 2002.

An actual inventory of all personal computers took place during March and April 2000. This was undertaken by Fire Fighter John Pederson of the Milwaukee Fire Department's Bureau of Technical Services. To perform this task, Mr. Pederson visited all MFD bureaus and firehouses. He took a count of personal computers and recorded serial numbers, processing speed and memory capacity. While this may seem like a simple task, the MFD has over 40 separate locations and there was little historical record keeping when the machines were originally ordered. Following is a condensed inventory of the MFD personal computers. A complete inventory can be found in the Appendix.

### **Personal Computer Condensed inventory**

Pentium 100	1
Pentium 133	1
Pentium 150	3
Pentium 166	28
Pentium 200	6
Pentium 233	2
Pentium 300 x 2 Work Station	1
Pentium 300 x 2 Server	3
Pentium 400	20
Pentium 450 x 2 Work Station	2
Pentium 450 x 2 work Station	2
Pentium 600	1
Total	68

## **2. What are the future projected needs for personal computers for the Milwaukee Fire Department?**

Without the starting point of an accurate inventory, it would be very difficult to plan for future computer needs. When reviewing the inventory, there appears to be a need to update many of the “lower end” systems, typically the Pentium 100 to the Pentium 233. While these computers are still very serviceable, many of the software applications that are being used within the department function more efficiently on machines that have a higher processing speed.

Many parts of the Milwaukee Fire Department 2000 business plan has goals and objectives that require adequate computer access and ability. The ability for field personnel to electronically file incident reports and personnel time sheets will require the acquisition and installation of seventy-one new personal computers. These computers will not only serve the needs of new reporting systems, but will also allow field personnel access to software suites that will allow e-mail, internet access and word processing. Presently, these commonplace business necessities are in fact a luxury on the Milwaukee Fire Department. The conversion from “Word Perfect” to “Word” as the standard word processing program will also require lower end machine to be replace to adequately perform when using the new software.

**3. What is the most cost-effective manner of acquisition of personal computers for the Milwaukee Fire Department?**

For the Milwaukee Fire Department, outright purchasing of computers remains the most cost-effective manner for acquisition of personal computers. Due to the relatively short life span of a PC and the lack of tax incentives for municipalities, there is no compelling reason to lease computers. The fiscal health of the City of Milwaukee allows the cash outlay for an item such as a PC without dramatic negative effects on the city balance sheet. This is not to say that leasing is always a bad idea. For more expensive items with a longer expected life span, or for agencies that lack adequate money to purchase an item outright, leasing could be an attractive alternative to cash purchase.

## DISCUSSION

Following a review of the inventory of personal computers taken by the Milwaukee Fire Department, it did become evident that there was a mismatch in some cases of employee to machine, or a lack of computer access caused administrative productivity to suffer. This supports Stevenson's (1992) premise that it can be more economical to maintain steady output even if it means added equipment costs. Using the inventory as a management tool (Held, 1991) amplified the need, as recommended by O'Donnell (1998), to upgrade certain work stations in a more timely fashion.

Miller (2000), P.C. Week (1997), Held (1991), and O'Donnell (1998) all warned about computer obsolescence. Coupled with an accurate inventory, the Milwaukee Fire Department can now lessen some of the effects of rapid technology growth by better matching the machine with the employee and attempting to get the longest possible life from each individual machine. As stated by the Seattle Fire Department (1999) report, the Milwaukee Fire Department falls somewhat below the recommended spending range for information technology funding. If the department is to take the position of timely replacement, funding must be increased.

To have an ability to replace personal computers before they become obsolete, O'Donnell (1998), P.C. Week (1997), and Rodgers (2000) all felt strongly that leasing of computer equipment could be a wise business practice. In addition, Mehler (1998) and Schallheim (1994) stated leasing was a way to stay ahead of the technology curve. It was agreed by both Bohmke (1991) and Carter (1999) that cash flows for an agency can be improved with the use of leases.

While there are many proponents of personal computer leasing, Sutton (1991) simply states that leasing costs more than purchasing a particular item. The costs could be so much more, that Consumer Reports (1998) stated that leasing would cost more even when compared to a credit card purchase. Spring (1998) pointed out additional costs such as shipping and processing fees that would make leasing an even more expensive endeavor. Finally, as stated by Rotar (2000), it is the City of Milwaukee's findings that leasing costs more than purchasing when applied to personal computer acquisitions.

This author feels strongly for the need to keep accurate inventory record and agrees with a systematic approach to replacement of personal computers. While leasing does seem attractive at first glance, finance charges, along with a lack of tax incentives, make cash purchasing of personal computers by a municipality and unwise business decision.

The implications for the Milwaukee Fire Department can be positive. By identifying future needs at an early time, the planning and budgeting will be in place before the need arises. In this fashion, needed funds will be earmarked to stay ahead of the technology curve. Taking away the option of leasing also increases the importance of having adequate funding in place to insure the ability to make personal computer purchases in a timely manner.

## RECOMMENDATIONS

An inventory system for all personal computers and related peripherals should be upgraded and maintain. For many years, inventory control for the Milwaukee Fire Department was “if it was not reported missing, everything was fine”. This does not allow for sound management of assets. It is recommended that the entire flow of the acquisition of a personal computer be tracked from the first requisition to the final disposal. This will allow the department to have a clearer picture of the state of technology equipment.

By inventorying the existing assets, and tracking future purchases, a periodic replacement of all PCs can be implemented. If the expected life of a computer is three years, funding should be available to replace one-third of all personal computers in any given year. Replacing high end users machines more often and “handing down” those still serviceable computers to operators who do not require the latest technology could reduce this expenditure.

Future technology needs make it necessary to purchase over seventy computers for field personnel. These purchases will have to be made at one time, make periodic replacement difficult due to the projected useful life expiring on the same date. These computers should not require as an aggressive replacement schedule, and could possibly be replaced if breakage were to occur as needed for the first two years, then implementing a three or four year turnover schedule.

While this author cannot recommend leasing as a viable option for acquiring personal computer used by the Milwaukee Fire Department, future changes in the fiscal health of the city could possibly change that feeling. It should be emphasized that leasing

can be a sound business decision for certain items such a fire apparatus, and any manager should maintain an open mind when making important purchasing decisions.



## REFERENCES

- Bohmke, M. (March, 1991). Using municipal leasing as a modern finance tool. *Fire chief*, pp. 36-38.
- Carter, H. (September, 1999). The lease of your concerns. *Fire chief*, pp. 50-53.
- Consumer Reports. (1998). *A computer lease costs you*. [Online]. Available <http://www.freep.com/tech/qcomp13.htm>. Accessed July 1, 2000.
- Federal Emergency Management Agency, United States Fire Administration. *Fire data analysis handbook*.
- Held, G. (1991). *The equipment acquisition book*. New York, NY: Van Nostrand Reinhold.
- Mehler, M. (1998). *The new deal with leasing*. [Online]. Available <http://www.zdnet.com/sp/channels/features/980601/leasing.html>. Accessed July 5, 2000.
- Miller, D. (2000). *Trade-in time: Micron and Gateway offer dollars for your old PC*. [Online]. Available [http://www.pcworld.com/shared/printable\\_articles/0,1440,8516,00.html](http://www.pcworld.com/shared/printable_articles/0,1440,8516,00.html). Accessed July 1, 2000.
- Milwaukee Fire and Police Commission. (1998). *City of Milwaukee 1997 public safety report*. Milwaukee, WI: Milwaukee Fire and Police Commission.
- Milwaukee Fire Department. (1993). *Rules of the Milwaukee Fire Department*. Milwaukee, WI: Milwaukee Fire Department.
- Milwaukee Fire Department. (1998). *1997 MFD annual report*. Milwaukee, WI: Milwaukee Fire Department.
- Milwaukee Fire Department. (1999). *2000 business plan*. Milwaukee, WI: Milwaukee Fire Department.
- Moyer, R.C., McGugian, J.R., Kretlow, W.J. (1995). *Contemporary financial management*. St. Paul, MN: West Publishing Company.
- O'Donnell, R. (1998). *Is computer leasing the right answer?* [Online]. Available <http://archive.infoworld.com/cgi-bin/displayNew.pl?odonnell/980406od.htm>. Accessed July 5, 2000.

- P.C. Week. (1997). *Leasing can help manage changing technology*. [Online]. Available <http://www.zdnet.com/zdnn/content/pcwk/1448/pcwk0088.html> Accessed July 5, 2000.
- Rodgers, J. (2000). *Is leasing computers a bargain or a boondoggle?* [Online]. Available <http://www.zdtv.com/zdtv/callforhelp/projects/story/0,3650,2110514,00.html>. Accessed July 16, 2000.
- Schallheim, J.S. (1994). *Lease or Buy? Principles for sound corporate decision making*. Cambridge, MA: Harvard Business School Press.
- Seattle Fire Department. (1999). *1999 Seattle fire department I/T survey*. Seattle, WA Pacific Technologies, Inc.
- Spring, T. (1998). *A hard look at computer leasing*. [Online]. Available <http://www.pcworld.com/pcwtoday/article/0,1510,8969,00.html>. Accessed July 2, 2000.
- Stevenson, W.J. (1992). *Introduction to management science*. Burr Ridge, Illinois: Irwin
- Sutton, R. (1991). *Don't get taken every time*. New York, NY. Penguin Books.

## **APPENDIX**

**MILWAUKEE FIRE DEPARTMENT  
PERSONAL COMPUTER INVENTORY**

USER	CPU	MEMORY (in MB)	DRIVE 1 (in GB)
Sue Jasicki	100	32	1
MVOI Tim Pelzek	133	32	1.25
Adjunct Lt's	150	32	1.5
FF Larry Jenkins	150	32	0.5
internal email server	150	32	0.5
Admin Training	166	32	1.5
AMVOI Henry Cannon	166	32	1.6
BC Andy Smerz	166	32	1.6
Bit classroom use	166	32	1.5
Bruce Rahlf	166	32	1.6
Car 3	166	32	1.5
Chris Herte	166	32	1
Cpt Sean Slowe	166	32	1
DC Dan Shea	166	32	1.5
DC Doug Holton	166	32	1.6
DC Gloria Murawsky	166	32	1
DC Jim Martins	166	32	1
DC Neil Lipski	166	32	4
FF Tina Severson	166	32	1.6
Jackie Semons	166	32	1.5
Jean Mooren	166	32	1.5
JoAnn Treu	166	32	1.5
Judy Kenne	166	32	1.6
Lt Chapman	166	32	1.6
Lt Jeff Friedrich	166	32	1.6
Lt Joe Hegeman	166	32	1.6
Lt Rick Hayes	166	32	1.5
Lt Scott Van Roo	166	32	1.6
Mary McDougal	166	32	1.5
None	166	32	1
Patricia Webster	166	32	1
Paul & Vinnie	166	32	1.6
Sharon Brock	166	32	1
Cheryl Finger	200	64	3.1
Dispatchers	200	32	3.1
Execpc email (milfire, milbts)	200	64	3.2
Sandra Mora	200	32	1
Theresa Krueger	200	64	4

web proxy server	200	64	3
Andy Pozorski	233	32	3.2
Car 1 Aide	233	32	3
AC Dennis Michalowski	400	64	10
CD Tony Stanford	400	64	9.3
Cheryl Finger	400	64	6
Chief Larry Gardner	400	64	9
Dale Theesfeld	400	64	10
DC Don Doro	400	64	10
Dispatch Supervisor	400	64	10
FF Bill Paulin	400	64	6
Jackie Christian	400	64	6
Juliet Battle	400	64	10
Karen Sharafinski	400	64	6
Lt Deb Karner	400	128	10
Training	400	64	10
Training	400	64	10
Training	400	64	10
Training	400	64	10
Training	400	64	10
Training	400	64	10
Training	400	64	10
Training	400	64	10
Lt Patrick Sierra	600	64	20
MIRS Server 1	300 x2 SVR	256	6
MIRS Server 2	300 x2 SVR	256	6
Server	300 x2 SVR	256	15.9
Lt Patrick Sierra	300 x2 WS	384	4
Cpt Jeff Zinuticz	450 x2 WS	256	9
FF John Pederson	450 x2 WS	256	9